Virtual power plant 85 kWh

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These days, it seems just about everything in your house can be connected to the internet in some way. From thermostats and water heaters to refrigerators and solar batteries, "smart" is the new black.

Homeowners with smart thermostats and/or rooftop solar and batteries can sign up with an aggregator to become part of a VPP, potentially earning up-front and ongoing incentive payments.

Selectively disable devices like smart thermostats, EV chargers, and industrial equipment temporarily during times of peak demand (this practice is called demand response).

For example, here"s a thought experiment: Say there are 10,000 homes with air conditioners that run during a given day, and the air conditioners each draw an average of 3 kilowatts (kW) when they"re active. That means the maximum possible demand for running those air conditioners simultaneously is 30 megawatts (MW); 3 kW x 10,000 homes = 30,000 kW, or 30 MW.

Now, say each of those air conditioners really only needs to run for 20 minutes total during the hour to maintain a comfortable temperature. If all 10,000 homes were connected to a VPP, the aggregator could remotely operate the smart thermostats, allowing only one-third of them to ever run at the same time and reducing the maximum demand to run them to just 10 MW.

Essentially, limiting the maximum demand from 30 MW to 10 MW by intelligently controlling the home"s thermostats eliminates the need for a 20 MW gas peaker plant. That prevents the environmental damage caused by burning all that natural gas quickly and inefficiently and also saves the grid operator money on expensive energy purchases.

As we mentioned above, purchasing peak power can cost utilities hundreds of times what power costs at other times of the day, so the savings generated by VPP aggregators can be very substantial. That potential for savings means many utilities are willing to pay VPP participants for the service they provide to the grid.

To participate, you generally need to sign a contract that states you"ll allow the VPP aggregator to either activate your battery or adjust your thermostat during peak evening times. Some VPPs require homeowners to participate on weekdays throughout the year, but others only activate the devices during days of very high usage due to extreme heat or cold.

That means giving up some energy storage or comfort for the good of the grid, but it can also be good for your wallet. VPP programs pay people for their participation, either through up-front or ongoing incentives.

Remember that VPPs are still in their infancy, so few places have fully-established programs. Additionally,

many VPPs are closed to residential participation. Here"s a short list of some current VPP programs:

Part of PG& E"s Emergency Load Reduction Program, Tesla acts as an aggregator, and homeowners with Powerwall batteries in PG& E territory are eligible. Participants earn $2 per kWh served during an event, with a minimum of 20 hours of events per year. More details.

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